PATENT
Attorney Docket No. 09875.0359-00

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re National Stage Application of International Application No. PCT/EP2003/014782 under 35 U.S.C. § 371 of:	
	Group Art Unit: 1712
Fabrizio DONAZZI et al.	Examiner: Tabassom Tadayyon Eslami
Application No.: 10/565,299	
PCT Filed: December 18, 2003	Confirmation No.: 7099
§ 371 Date: July 12, 2006	**Mail Stop AF**
For: CONTINUOUS PROCESS FOR MANUFACTURING ELECTRICAL CABLES	

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

DECLARATION UNDER 37 C.F.R. § 1.132

I, Alberto Bareggi do hereby make the following declaration:

1. I am a citizen of Italy, residing at Via Aselli N°35, Italy.

2. I have been awarded a degree in Mechanical Engineering in 1989 from the Technical University Politecnico di Milano, Italy.

3. I am and have been employed with Prysmian S.p.A. (and its predecessor companies) as a technician in Research and Innovation since 1990. More particularly, I am engaged in the research and development activity for Terrestrial Energy Cables,

mainly related to the development of innovative technologies for production of extruded cables.

4. I am one of the inventors of U.S. Patent Application No. 10/565,299 to Fabrizio DONAZZI et al. and, thus, am familiar with the subject matter of the application.

5. Given my education and experience in the field of electrical cables, I consider myself able to provide the following testimony.

6. The art at the time of the instantly claimed invention did not teach a continuous process for manufacturing an electric cable that included forming a metal screen around an extruded insulating layer. Rather, it was believed that a resting or collecting step was necessary after extruding the insulating layer and prior to forming the metallic screen around the extruded insulating layer. In other words, it was believed that a continuous process was not possible.

7. As discussed in our application, the need for a resting or collecting step between extruding the insulating layer and applying the metal screen was believed to be a requirement for cables for Medium Voltage (M.V.) or higher voltage rate, where cross-linked insulation is used.

8. With respect to cables with crosslinked insulating layers, the resting or collecting step provided the necessary time for water to diffuse through the insulating layer so as to initiate the crosslinking process with the silane crosslinking agents in the insulating layer. When peroxides were used for crosslinking, the resting or collecting step was necessary to allow the gases generated by the crosslinking process to diffuse out of the insulating layer and away from the cable. The premature addition of a metal

screen would inhibit, if not prevent, these processes from occurring. Further, the time required for these processes can be substantial, such as hours or days.

9. It is Applicants' experience that without such proper degassing of the cable insulation, undesired deformations of the outer layers may result from expansion of the formed gases. It has also been noted that the formed gases are explosive and may ignite when the cable is laid or joined. Finally, in the absence of a proper degassing of the cable insulation prior to further layers application, an undesired porosity in the insulation may be formed which can deteriorate the electric properties of the insulating layer.

10. Moreover, with regard to cables with either crosslinked or non-crosslinked insulating layers, a resting or collecting step was also deemed necessary prior to forming the metallic screen around the extruded insulating layer. If the screen is formed by helicoidally winding wires or tapes around the extruded insulating layer, a resting or collecting step is necessary for allowing a proper operation of the rotating apparatus, revolving around the cable for applying the wires or tapes unwound from spools, so that the overall process is necessarily non-continuous.

11. On the other hand, if the screen is formed by longitudinally folding a circumferentially continuous metal screen around the extruded insulating layer, a resting or collecting step was deemed to be necessary also to bring the insulating layer down to room temperature, as needed for avoiding the creation of voids that would otherwise form between the metallic screen and the insulating layer of the finished cable.

12. The presence of voids inside a cable may cause the partial electrical discharges during the operation of the cable and cause breakdown of the cable. In addition, voids can create kinks in the cable due to the buckling of the metallic screen under remarkable or successive bending actions occurring on the cable (e.g., when winding the finished cable on a reel or on a storage unit). The formation of these kinks in the metallic screen has undesirable consequences since it negatively affects the mechanical resistance of the screen, in particular the fatigue failure of the metallic screen. Further, because a polymeric layer is generally extruded over the metallic screen, the formation of kinks, such as by voids, in the metallic screen may cause localized detachments of the polymeric layer from the screen.

13. Such resting or collecting steps are illustrated in the art cited by the Examiner. For example, in Figures 2 and 4 of U.S. Patent No. 4,225,749 to Pierre, it can be seen that cable 12 (which contains the extruded insulating layer) is resting on a reel. Only after this resting step is metal strip 14 folded around cable 12. In addition, Example 3 of WO 99/33070 to Belli (my co-inventor) teaches winding a semi-finished cable product (after extruding an insulating layer) on a reel. In Example 5, the same technique is used prior to adding a metal strip around the polymer. Thus, the processes of Pierre and Belli teach the discontinuous method of applying a resting or collecting step between extruding the insulating layer and applying the metal screen. This is consistent with the understanding in the art prior to the instantly claimed invention that there was a need for a resting or collecting step prior to forming metallic screen around an extruded insulating layer.

14. We believe that the formation of voids is due to the differences in expansion properties of metals and plastics; when the cable cools from a high temperature (such as >70 °C), the insulating layer shrinks faster than the metal screen, particularly when a tube has been formed by longitudinally folding a metal sheet. We discovered that the maximum temperature of the extruded insulating layer, at the time of forming the circumferentially closed metallic screen thereupon, is a critical parameter for a correct working of the finished cable and that if we cooled a cable with a non-crosslinked insulating layer, for example, to a temperature from about 30°C to about 70°C, the process can operate continuously from feeding a conductor to folding a metal sheet, as previously unknown. The range was determined to be low enough to avoid the expansion concerns and high enough that a continuous process is practical.

15. In summary, the state of the art prior to the filing date of the instant application was a perceived requirement for a resting or collection step between extruding the insulating layer and applying the metal screen. We are not aware of any appreciation in the art of any technical achievement that would permit the avoidance of the resting or collection step so as to achieve a continuous process for manufacturing an electrical cable with a non-crosslinked insulating layer.

16. I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true, and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Dated: 24/11/2010

By: _____
Alberto Bareggi